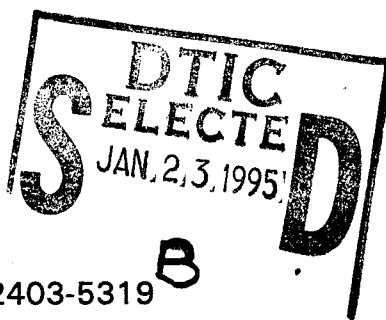




DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

14 DEC 1994



FROM: HQ AFCESA/CESC
139 Barnes Drive
Tyndall AFB FL 32403-5319

SUBJECT: Engineering Technical Letter (ETL) 94-9: Silicone Joint Sealants for Pavements

1. Purpose. This ETL provides a specification for silicone sealants used to seal joints in Air Force pavements.

2. Application. Requirements of this ETL are mandatory for all Air Force facilities.

2.1. Authority: AFM 88-6Ch7, *Standard Practice for Sealing Joints and Cracks in Rigid and Flexible Pavements*.

2.2. Effective Date: Immediately. Remains in effect until replaced by an appropriate American Society for Testing and Materials (ASTM) specification. Expires five years from date of issue.

2.3. Ultimate Recipients:

- Base Civil Engineers responsible for design, construction, maintenance, and repair of pavements.
- Corps of Engineers and Navy offices responsible for design of Air Force pavements.

3. Reference Publications.

3.1. ASTM Standard C 603, *Test Method for Extrusion Rate and Application Life of Elastomeric Sealants*.

3.2. ASTM Standard C 639, *Test Method for Rheological (Flow) Properties of Elastomeric Sealants*.

3.3. ASTM Standard C 661, *Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer*.

3.4. ASTM Standard C 679, *Test Method for Tack-Free Time of Elastomeric Sealants*.

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3.5. ASTM Standard C 719, *Test Method for Adhesion or Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)*.

3.6. ASTM Standard C 792, *Test Method for Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants*.

3.7. ASTM Standard C 793, *Test Method for Effects of Accelerated Weathering on Elastomeric Joint Sealants*.

3.8. ASTM Standard D 412, *Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension*.

3.9. Federal Specification SS-S-200, *Sealants, Joint, Two-Component, Jet-Blast Resistant, Cold-Applied, for Portland Cement Concrete Pavement*.

4. Specific Requirements. Single-component, cold-applied joint sealant will be self-leveling, non-acid curing, and satisfy the following criteria:

Test	Method	Criteria
Weight loss	ASTM C 792, modified ¹	10% maximum
Flow	ASTM C 639 (Type 1)	Smooth and level
Extrusion rate	ASTM C 603	30 seconds maximum
Tack free time	ASTM C 679	5 hours maximum
Hardness (shore 00) ²	ASTM C 661	30-80
Tensile stress at 150% elongation ²	ASTM D 412 (Die C)	207 kPa (30 psi) maximum
Percent elongation ²	ASTM D 412 (Die C)	700 minutes
Accelerated weathering ³	ASTM C 793	Pass 5000 hours
Bond and movement capability	ASTM D 719	Pass 10 cycles at $\pm 50\%$ movement (no adhesion or cohesion failure)
Flame resistance	FedSpec SS-S-200	Pass

¹ Percent weight loss of wet (uncured) sample after placing in forced-draft oven maintained at 70 ± 2 °C for 2 hours.

² Specimen cured 21 days at 23 ± 2 °C and $50\pm 5\%$ humidity.

³ In lieu of testing joint sealant, submit a factory test report performed within 2 years of contract award.

4. Point of Contact: Mr. Jim Greene, HQ AFCESA/CESC, DSN 523-6334,
commercial (904) 283-6334.



Rita A. Gregory, Ph.D., PE
Director of Systems Engineering

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1. Distribution List
2. ETL Index

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ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
83-1	Design of Control Systems for HVAC Change No. 1 to ETL 83-1, U.S. Air Force Standardized Heating, Ventilating & Air Conditioning (HVAC) Control Systems	16 Feb 83 22 Jul 87
83-3	Interior Wiring Systems, AFM 88-15, Para 7-3	2 Mar 83
83-4	EMCS Data Transmission Media (DTM) Considerations	3 Apr 83
83-7	Plumbing, AFM 88-8, Chapter 4	30 Aug 83
83-8	Use of Air-to-Air Unitary Heat Pumps	15 Sep 83
83-9	Insulation	14 Nov 83
84-7	MCP Energy Conservation Investment Program (ECIP)	13 Jun 84
84-10	Air Force Building Construction and the Use of Termiticides	1 Aug 84
86-2	Energy Management and Control Systems (EMCS)	5 Feb 86
86-4	Paints and Protective Coatings	12 May 86
86-5	Fuels Use Criteria for Air Force Construction	22 May 86
86-8	Aqueous Film Forming Foam Waste Discharge Retention and Disposal	4 Jun 86
86-9	Lodging Facility Design Guide	4 Jun 86
86-10	Antiterrorism Planning and Design Guidance	13 Jun 86
86-14	Solar Applications	15 Oct 86
86-16	Direct Digital Control Heating, Ventilation, and Air Conditioning Systems	9 Dec 86
87-1	Lead Ban Requirements of Drinking Water	15 Jan 87
87-2	Volatile Organic Compounds	4 Mar 87
87-9	Prewiring	21 Oct 87
88-2	Photovoltaic Applications	21 Jan 88
88-3	Design Standards for Critical Facilities	15 Jun 88
88-4	Reliability & Maintainability (R&M) Design Checklist	24 Jun 88
88-6	Heat Distribution Systems Outside of Buildings	1 Aug 88
88-9	Radon Reduction in New Facility Construction	7 Oct 88
88-10	Prewired Workstations Guide Specification	29 Dec 88
89-2	Standard Guidelines for Submission of Facility Operating and Maintenance Manuals	23 May 89
89-4	Systems Furniture Guide Specification	6 Jul 89
89-6	Power Conditioning and Continuation Interfacing Equipment (PCCIE) in the Military Construction Program (MCP)	7 Sep 89

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
89-7	Design of Air Force Courtrooms	29 Sep 89
90-1	Built-Up Roof (BUR) Repair/Replacement Guide Specification	23 Jan 90
90-2	General Policy for Prewired Workstations and Systems Furniture	26 Jan 90
90-3	TEMPEST Protection for Facilities Change 1 Ref: HQ USAF/LEEDE Ltr dated 20 April 90, Same Subject	23 Mar 90
90-5	Fuel and Lube Oil Bulk Storage Capacity for Emergency Generators	26 Jul 90
90-6	Electrical System Grounding, Static Grounding and Lightning Protection	3 Oct 90
90-7	Air Force Interior Design Policy	12 Oct 90
90-8	Guide Specifications for Ethylene Propylene Diene Monomer (EPDM) Roofing	17 Oct 90
90-9	Fire Protection Engineering Criteria for Aircraft Maintenance, Servicing, and Storage Facilities	2 Nov 90
90-10	Commissioning of Heating, Ventilating, and Air Conditioning (HVAC) Systems Guide Specification	17 Oct 90
91-1	Fire Protection Engineering Criteria Testing Halon Fire Suppression Systems	2 Jan 91
91-2	High Altitude Electromagnetic Pulse (HEMP) Hardening in Facilities	4 Mar 91
91-4	Site Selection Criteria for Fire Protection Training Areas	14 Jun 91
91-5	Fire Protection Engineering Criteria - Emergency Lighting and Marking of Exits	18 Jun 91
91-6	Cathodic Protection	3 Jul 91
91-7	Chlorofluorocarbon (CFC) Limitation in Heating, Ventilating and Air-Conditioning (HVAC) Systems	21 Aug 91
93-1	Construction Signs	11 Mar 93
93-2	Dormitory Criteria for Humid Areas	13 Jul 93
93-3	Inventory, Screening, Prioritization, and Evaluation of Existing Buildings for Seismic Risk	18 Aug 93
93-4	Fire Protection Engineering Criteria - Automatic Sprinkler Systems in Military Family Housing (MFH)	11 Aug 93

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
93-5	Fire Protection Engineering Criteria - Electronic Equipment Installations	22 Dec 93
94-1	Standard Airfield Pavement Marking Schemes	5 Apr 94
94-2	Utility Meters in New and Renovated Facilities	10 Jun 94
94-3	Air Force Carpet Standard	10 Jun 94
94-4	Energy Usage Criteria for Facilities in the Military Construction Program	19 Aug 94
94-5	Fire Protection Engineering Criteria and Technical Guidance - Emergency Lighting and Marking of Exits	8 Nov 94
94-6	Fire Protection Engineering Criteria and Technical Guidance - Removal of Halogenated Agent Fire Suppression Systems	5 Dec 94
94-7	Affirmative Procurement Requirements for Construction and Other Civil Engineering Specifications	14 Dec 94
94-8	Design in Metric	14 Dec 94
94-9	Silicone Joint Sealants for Pavements	14 Dec 94

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION B - OBSOLETE ETLs

ETL Number	Date	Status
82-1	10 Nov 82	Superseded by ETLs 83-10, 86-1, 87-4
82-2	10 Nov 82	Superseded by AFEPPM 88-10
82-3	10 Nov 82	Superseded by ETLs 83-5, 84-2
82-4	10 Nov 82	Superseded by ETL 84-7
82-5	10 Nov 82	Superseded by ETLs 84-1, 86-13, 86-14
82-6	30 Dec 82	Cancelled
82-7	30 Nov 82	Cancelled
83-2	16 Feb 83	Superseded by ETL 84-3
83-5	5 May 83	Superseded by ETL 84-2
83-6	24 May 83	Cancelled
83-10	28 Nov 83	Superseded by ETL 86-1
84-1	18 Jan 84	Superseded by ETL 86-14
84-2	27 Mar 84	Superseded by ETL 94-4
84-3	21 Mar 84	Cancelled
84-4	10 Apr 84	Superseded by ETLs 86-7, 86-15, 87-5
84-5	7 May 84	Superseded by ETLs 84-8, 86-11, 86-18, 88-6
84-6	Not Issued	Cancelled/Not Used
84-8	19 Jun 84	Superseded by ETL 86-11
84-9	5 Jul 84	Superseded by ETL 88-7
88-5	2 Aug 88	Superseded by ETL 91-6
86-1	3 Feb 86	Superseded by ETL 87-7
86-3	21 Feb 86	Superseded by ETL 86-4
86-6	3 Jun 86	Superseded by ETLs 86-11, 86-18, 88-6
86-7	3 Jun 86	Superseded by ETL 86-15
86-11	3 Jul 86	Superseded by ETL 88-6
86-12	3 Jul 86	Superseded by ETL 90-2
86-13	18 Aug 86	Superseded by ETL 86-14
86-15	13 Nov 86	Superseded by ETL 87-5
86-17	17 Dec 86	Superseded by ETL 89-6
86-18	18 Dec 86	Superseded by ETL 88-6
87-3	12 Mar 87	Superseded by ETLs 87-6, ETL 88-5
87-4	13 Mar 87	Superseded by ETL 94-4
87-5	13 July 87	Superseded by ETL 94-2
87-6	21 Aug 87	Superseded by ETL-88-5
87-7	14 Oct 87	Superseded by ETL 89-1
87-8	19 Oct 87	Superseded by ETL 90-1
88-1	5 Jan 88	Superseded by ETL 89-2
88-5	2 Aug 88	Superseded by ETL 91-6
88-7	24 Aug 88	Superseded by ETLs 90-3, 91-2
88-8	4 Oct 88	Superseded by ETL 91-7
89-1	6 Feb 89	Superseded by ETL 90-4
89-3	9 Jun 89	Superseded by ETL 93-5
89-5		Issued as ETL 90-7
90-4	24 May 90	Cancelled
91-8	24 Sep 91	Cancelled
91-3	14 Jun 91	Superseded by MIL HDBK 1008B, Jan 94

CONSTRUCTION TECHNICAL LETTERS (CTL)

SECTION C - CURRENT CTLs

CTL Number	Title	Date Issued
88-2	DD Form 1354 Checklist	6 Jan 88
88-7	Constructibility Review Checklist	1 Nov 88
89-1	Thirty-Percent Design Submittal	10 Apr 89
89-2	MAJCOM Construction Management	30 May 89
89-3	Warranty and Guarantee Program	22 Sep 89
90-1	Management of the MILCON Planning and Execution Process	6 Mar 90
90-2	Definitions for Design Milestones	13 Mar 90

SECTION D - OBSOLETE CTLs

CTL Number	Status
87-1	Superseded by CTL 88-3
88-1	Superseded by CTL 90-1
88-3	Superseded by ETL
88-4	Replaced by Electronic Data File and Documentation in PDC/WIMS
88-5	Superseded by CTL 90-2
88-6	Issuance Cancelled